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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/528,808	03/23/2005	Leonard I. Zon	701039-53222	8743

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EXAMINER	
KETTER, JAMES S	

ART UNIT	PAPER NUMBER
1636	

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01/25/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/528,808	ZON ET AL.	
	Examiner	Art Unit	
	James S. Ketter	1636	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 November 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 March 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *(2)*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Applicant's election without traverse of the species cdx4 in the reply filed on 15 November 2007 is acknowledged.

Claims 1-29 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for cdx4 gene or peptide for hematopoietic differentiation of a mammalian stem cell, does not reasonably provide enablement for other genes, including cdx1 and cdx2, for hematopoietic differentiation of mammalian stem cells, nor for any gene for proliferation of mamlian stem cells. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims.

The following factors have been considered in the rejection:

The nature of the invention. The invention requires that the recited cdx gene cause either proliferation or hematopoietic differentiation of stem cells. Differentiation of a stem cell along any path, certainly including hematopoiesis, by definition excludes the proliferation of that cell as a stem cell, in that the differentiated or partially-differetiated cell is no longer a mammalian stem cell.

The amount of direction or guidance presented in the specification, and the presence or absence of working examples. The specification does not present any data or exemplification with respect to cdx1, cdx2 or any other cdx gene except for cdx4, showing hematopoietic differentiation of stem cells. Furthermore, no data or exemplification is set forth with respect to causing stem cells to proliferate using any cdx gene. There is no discussion of any modifications to the other cdx genes to cause them to determine the differentiation of the cells, and there is no

discussion of any modification to any of the cdx genes to cause proliferation instead of differentiation.

The state of the art, and the predictability or unpredictability of the art. The art did not discuss the roles of any cdx genes in either hematopoietic differentiation or proliferation of stem cells. The art did not provide any guidance to modifying cdx genes to cause proliferation of stem cells instead of differentiation of some sort. The cdx genes were originally identified based upon their effect on caudal development in embryogenesis, which would not have particularly led one of skill in the art to predict or conclude that all cdx genes would have the specific hematpoietic differentiation function of cdx4 that applicants have demonstrated. Furthermore, the function of a protein in relation to its structure, i.e., amino acid sequence, is and was not well understood in the art, and hence modifications to proteins for which there was no 3-dimensional structural knowledge, leading to a particular new function of the protein, were unpredictable, requiring a significant degree of trial-and-error experimentation.

The quantity of experimentation. As noted above, trial-and-error experimentation would be required to produce a modified cdx gene with the new function of stimulation of proliferation of stem cells, which would require the creation and screening of a large number of putative mutations to find one that operated as desired. Furthermore, finding (i.e., identifying) other cdx genes beyond the few that were known in the prior art and then testing them for the function of either differentiation or proliferation would have represented a large amount of experimentation.

Conclusion. Were the practitioner of ordinary skill in the art to have attempted to practice the claimed invention for other then cdx4 causing hematopoietic differentiation of mammalian stem cells, or any cdx genes or peptides for the proliferation of mammalian stem

cells, said practitioner first would have turned to the specification for guidance in selecting other cdx genes which would function to differentiate mammalian stem cells, or to proliferate mammalian stem cells. However, as set forth above, neither the art nor the specification provided the necessary teachings and guidance for one of skill to have selected the gene or peptide other then cdx4 which would have functioned as recited. Next, said practitioner would have turned to the prior art for the required teachings. However, as set forth above, the art did not teach that other cdx genes would cause hematopoietic differentiation of stem cells, nor that any cdx genes would case proliferation of stem cells. The art also failed to teach how modifications might be made to cdx genes to bring about these results. Finally, said practitioner would have turned to empirical experimentation to find other cdx genes which would give rise to the recited effects. However, a large amount of experimentation of a trial-and-error nature in an unpredictable art, with insufficient guidance from the specification and the prior art, would have been deemed undue experimentation.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-10, 12-14, 16-25, 27 and 28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The instant claims recite or depend from claims reciting "cdx". However, the genus of cdx genes and/or peptides is not clearly defined in the specification or the prior art. Any gene might be designated as a cdx without any connection to the disclosed cdx genes (i.e., cdx1, -2

and -4), and a gene might be considered part of the cdx genus but have a different designation. As such, it is not clear what the metes and bounds of the instant claims would be.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James S. Ketter whose telephone number is 571-272-0770. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Remy Yucel can be reached on 571-272-0781. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JSK
14 January 2008

JAMES KETTER
PRIMARY EXAMINER